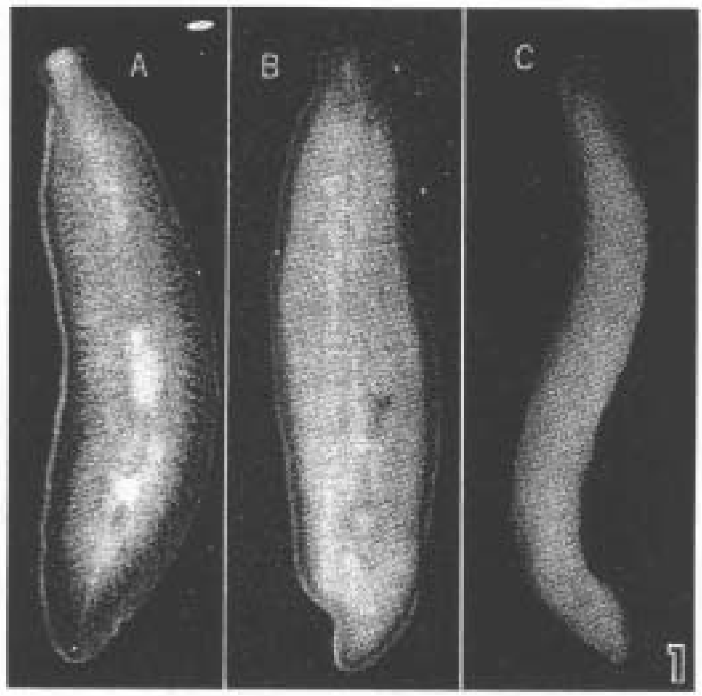
Conservation Assessment for Hoffmaster's Cave Flatworm (Macrocotyla hoffmasteri)



(from Kenk, 1975)

USDA Forest Service, Eastern Region

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This Conservation Assessment was prepared to compile the published and unpublished information on Macrocotyla hoffmasteri. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject community and associated taxa, please contact the Eastern Region of the Forest Service Threatened and Endangered Species Program at 310 Wisconsin Avenue, Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

Hoffmaster's cave flatworm is designated as a Regional Forester Sensitive Species on the Monongahela National Forest in the Eastern Region of the Forest Service. The purpose of this document is to provide the background information necessary to prepare a Conservation Strategy, which will include management actions to conserve the species.

Hoffmaster's cave flatworm is a rare subterranean planarian known only from caves in Randolph, Pendleton, Greenbrier and Tucker counties in eastern West Virginia.

NOMENCLATURE AND TAXONOMY

Classification: Class Turbellaria
Order Tricladida
Family Kenkiidae

Scientific Name: Macrocotyla hoffmasteri

Common Name: Hoffmaster's cave flatworm

Synonyms: Speophila hoffmasteri
Sphalloplana hoffmasteri
Speophila hoffmeisteri

This species was described by Hyman (1954) as Speophila hoffmasteri with a written description and figures. The species was redescribed by Kenk (1975) with a detailed figure of the internal anatomy and a lengthy written account.

Hyman (1956) erected the genus Macrocotyla but placed only one species from Missouri in the new genus. Speophila was placed as a subgenus (rather than as a distinct genus) of Sphalloplana resulting in the listing of the species as Sphalloplana hoffmasteri by Kenk (1972). Subsequently, Kenk (1975) redescribed the species, recognized its true affinities, and changed it to Macrocotyla hoffmasteri. The name Speophila hoffmeisteri (Ball, 1969) is merely a misspelling.

Originally placed in the Family Planaridae, Kenk (1975) resurrected the Family Kenkiidae (Hyman, 1937) and placed Macrocotyla in it.

DESCRIPTION OF SPECIES

This is an eyeless, unpigmented flatworm. It is totally white in appearance and is about 15mm in length when totally extended, 1.5mm in width (Kenk, 1975). . Identification of this species requires laboratory sectioning and examination of slide-mounted sections under a compound microscope by a specialist in flatworm taxonomy.

LIFE HISTORY

Nothing is known of the life history of this species. In general subterranean flatworms may be omnivores feeding on dead animals or perhaps microbes in pools, or on occasion predators on crustaceans.

HABITAT

Macrocotyla hoffmasteri is an obligate subterranean species that is known only from caves. Kenk (1975) reported it as being found under stones in cave streams and in pools. The water from which the worms were taken in Blowhole Cave in 1973 was reported as being slightly polluted, but no other physicochemical data was known. Holsinger, et. al. (1976) reported that Macrocotyla hoffmasteri occurred in a variety of cave habitats, including stream gravels, the undersides of rocks, stream pools and drip pools.

DISTRIBUTION AND ABUNDANCE

Macrocotyla hoffmasteri was first recorded from Blowhole (type-locality) and Mystic caves, Pendleton Co., West Virginia (Hyman, 1954). The flatworms were collected again by Carpenter (1970). Material was again collected for the work of Kenk (1975). It is apparent from the multiple collections that the species is at least abundant enough to be found repeatedly over an approximately 20 year period. Kenk (1975) reported other collection localities in Pocahontas, Greenbrier, Tucker and Randolph counties, in West Virginia for a total of 10 sites, all caves. Holsinger, et. al. (1976) reported Macrocotyla hoffmasteri from 11 caves in the West Virginia counties cited above. They noted that the species was usually uncommon, but sporadically abundant. Juveniles unidentifiable to species and sight records were given for an additional 15 caves in the previously reported counties that may be Macrocotyla hoffmasteri.

RANGEWIDE STATUS

Global Rank: G2 imperiled; The global rank of G2 typically includes species that are known globally from between 6 and 20 localities. Macrocotyla hoffmasteri was reported by Holsinger, et. al. (1976) from 11 localities, which gives it the global rarity rank of G2. The 15 additional juvenile and sight records would elevate this species to G3 if they are confirmed as Macrocotyla hoffmasteri.

West Virginia State Rank: S2 imperiled; The state rank of S2 includes species that are known from between 6 and 20 localities in West Virginia. All of the 11 known localities for this species are in West Virginia.

POPULATION BIOLOGY AND VISABILITY

Holsinger, et. al. (1976) reported that in Blowhole Cave Macrocotyla hoffmasteri as being associated with, and outnumbered by, the troglophilic flatworm Phagocata morgani. This cave was also reported as being somewhat polluted.

POTENTIAL THREATS

Due to the presence of Macrocotyla hoffmasteri in the restricted cave environment, it is susceptible to a wide variety of disturbances (Elliott, 1998). Caves are underground drainage conduits for surface runoff, bringing in significant quantities of nutrients for cave communities. Unfortunately, contaminants may be introduced with equal ease, with devastating effects on cave animals. Potential contaminants include (1) sewage or fecal contamination, including sewage plant effluent, septic field waste, campground outhouses, feedlots, grazing pastures or any other source of human or animal waste (Harvey and Skeleton,1968; Quinlan and Rowe, 1977, 1978; Lewis, 1993; Panno, et al 1996, 1997, 1998); The stream in the type-locality was noted to be polluted by Kenk (1975), but the specifics of the situation remain unknown. (2) pesticides or herbicides used for crops, livestock, trails, roads or other applications; fertilizers used for crops or lawns (Keith and Poulson, 1981; Panno, et al. 1998); (3) hazardous material introductions via accidental spills or deliberate dumping, including road salting (Quinlan and Rowe, 1977, 1978; Lewis, 1993, 1996).

Habitat alteration due to sedimentation is a pervasive threat potentially caused by logging, road or other construction, trail building, farming, or any other kind of development that disturbs groundcover. Sedimentation potentially changes cave habitat, blocks recharge sites, or alters flow volume and velocity. Keith (1988) reported that pesticides and other harmful compounds like PCB’s can adhere to clay and silt particles and be transported via sedimentation.

Impoundments may detrimentally affect cave species. Flooding makes terrestrial habitats unusable and creates changes in stream flow that in turn causes siltation and drastic modification of gravel riffle and pool habitats. Stream back-flooding is also another potential source of introduction of contaminants to cave ecosystems (Duchon and Lisowski, 1980; Keith, 1988).

Smoke is another potential source of airborne particulate contamination and hazardous material introduction to the cave environment. Many caves have active air currents that serve to inhale surface air from one entrance and exhale it from another. Potential smoke sources include campfires built in cave entrances, prescribed burns or trash disposal. Concerning the latter, not only may hazardous chemicals be carried into the cave environment, but the residue serves as another source of groundwater contamination.

Numerous caves have been affected by quarry activities prior to acquisition. Roadcut construction for highways passing through national forest land is a similar blasting activity and has the potential to destroy or seriously modify cave ecosystems. Indirect effects of blasting include potential destabilization of passages, collapse and destruction of stream passages, changes in water table levels and sediment transport (Keith, 1988).

Oil, gas or water exploration and development may encounter cave passages and introduce drilling mud and fluids into cave passages and streams. Brine produced by wells is extremely toxic, containing high concentrations of dissolved heavy metals, halides or hydrogen sulfide. These substances can enter cave ecosystems through breach of drilling pits, corrosion of inactive well casings, or during injection to increase production of adjacent wells (Quinlan and Rowe, 1978).

Cave ecosystems are unfortunately not immune to the introduction of exotic species. Out-competition of native cavernicoles by exotic facultative cavernicoles is becoming more common, with species such as the exotic milliped Oxidus gracilis affecting both terrestrial and aquatic habitats. The replacement of native deciduous forest species by pines after clear cutting stands to significantly change the volume and form of nutrients flowing into underlying cave systems.

With the presence of humans in caves comes an increased risk of vandalism or littering of the habitat, disruption of habitat and trampling of fauna, introduction of microbial flora non-native to the cave or introduction of hazardous materials (e.g., spent carbide, batteries). The construction of roads or trails near cave entrances encourages entry.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

Much of the range of this species is within the Monongahela National Forest.

SUMMARY OF MANAGEMENT AND CONSERVATION ACTIVITIES

No species specific management activities are being conducted concerning Macrocotyla hoffmasteri.

The existing (1985) Monongahela Land and Resource Management Plan does not provide management direction for caves although they are being considered in the Forest Plan revision currently underway. A Forest Plan Amendment in progress for Threatened and Endangered Species will include management for the caves on the forest.

RESEARCH AND MONITORING

No species specific research or monitoring activities are being conducted concerning Macrocotyla hoffmasteri.

RECOMMENDATIONS

Retain on list of Regional Forester Sensitive Species.

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